

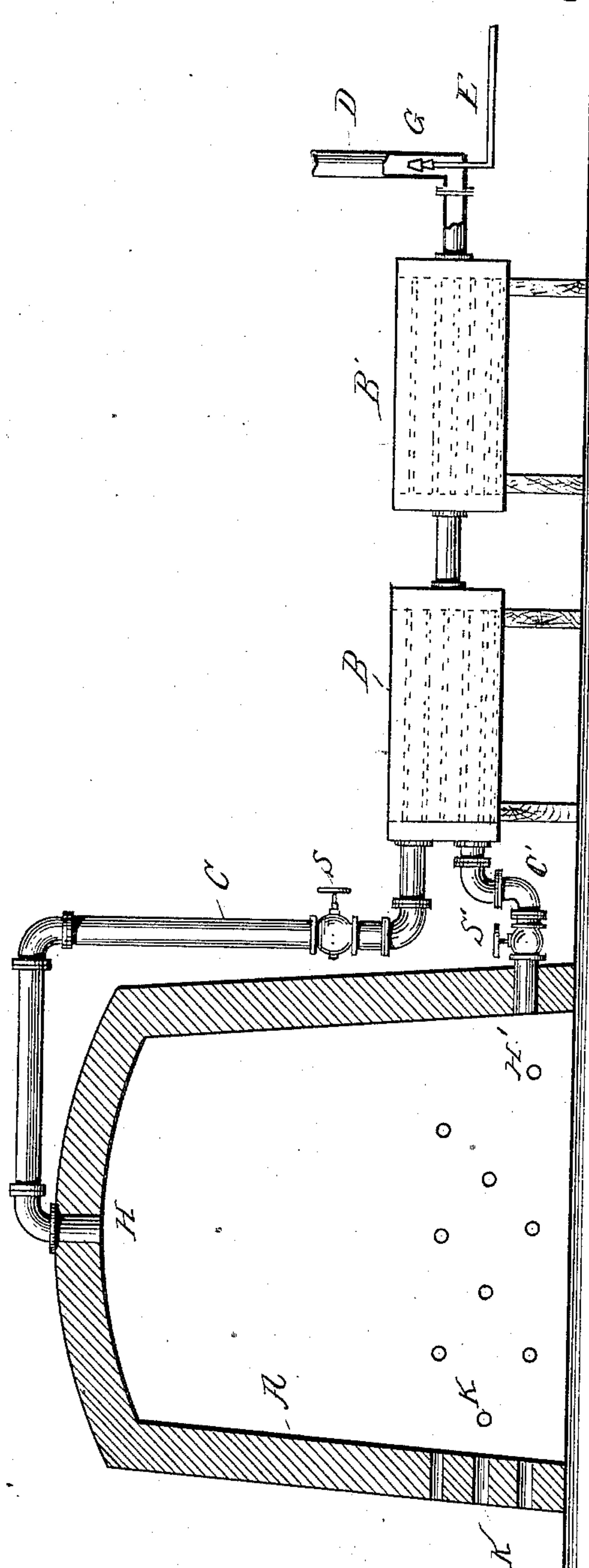
(No Model.)

H. M. PIERCE.

METHOD OF DISTILLING AND CHARRING WOOD AND KILN THEREFOR.

No. 284,058.

Patented Aug. 28, 1883.



Witnesses:

W. Reynolds
Edward C. Ellis

Inventor

Henry M. Pierce
per O. E. Duffy
att'y

UNITED STATES PATENT OFFICE.

HENRY M. PIERCE, OF CHICAGO, ILLINOIS.

METHOD OF DISTILLING AND CHARRING WOOD AND KILN THEREFOR.

SPECIFICATION forming part of Letters Patent No. 284,058, dated August 28, 1883.

Application filed June 2, 1883. (No model.)

To all whom it may concern:

Be it known that I, HENRY M. PIERCE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Methods of Distilling and Charring Wood and Kilns therefor; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon, which forms part of this specification.

The object of my invention is to withdraw from a charring chamber, kiln, or oven the gases evolved in the carbonization of wood, to convey them through one or more condensers, and to project the uncondensed portion of these gases into a furnace for fuel purposes.

The figure of the drawing represents a vertical longitudinal section of a charcoal-kiln and of a condensing apparatus connected therewith.

A is the kiln in which the wood is treated; B B', condensers. C C' are flues respectively connecting the top and bottom of the kiln A with condensing apparatus B B'. D is the flue through which the uncondensed gases are exhausted. K K' are air-inlets, and H H' are gas-outlets. E is a steam-pipe, and G is a steam-ejector. S S' are dampers in flues C C'.

The operation of the above-described apparatus is as follows: The kiln is first filled with wood. Then it is closed and hermetically sealed, excepting at the bottom, where the holes K K' are kept open for the admission of air. Fire is then communicated to the wood in the kiln, and the carbonization of the charge commences.

In the ordinary process of making charcoal the gases thrown off as the charring progresses find egress through the vents H H'. In my method these vents H H' are closed, and the gases evolved are steadily exhausted from the kiln A through flues C C', and through the condensers B B' and flue D, by means of steam-ejector G.

When the resinous wood of the South is being treated in kiln A for charcoal, the flue C

is used in the earlier stages of the process, and before the dry distillation of the wood actually commences, for withdrawing and economizing the turpentine vapors that first come over with the vapors of the water held free in the body of the wood. After all the turpentine has been distilled over and condensed in vessels B B', damper S in flue C is closed and damper S' in flue C' opened, and this arrangement of flue and damper maintained until the close of the operation. In passing through the condensers or coolers B B' about three-quarters in weight and volume of these gases are reduced to liquid form. This liquid pyroligneous acid is treated in the usual manner for acetic acid, acetate of lime, wood alcohol, and tarry compounds. The uncondensable gases are withdrawn from the exit end of condenser B' and driven through flue D to the furnace, where they are used for fuel. As the process of carbonization of the wood in the kiln advances, these uncondensable gases become irregular, fitful, and highly inflammable. However valuable these gases may be for fuel purposes, it is highly dangerous to use them when in this condition, owing to their tendency to violent explosions in kilns constructed and operated in the usual manner. These explosions extend backward through flue D, condensers B B', to kiln A, with danger to operatives and injury to flues and condensing apparatus. At such periods my application of the steam-ejector is not only most beneficial, but absolutely necessary to the utilization of these gases with safety. The steam-ejector, applied at or near the point where the uncondensable gases issue from the condenser, moistens these gases, distributes them through steam-vapors, and projects them in a strong current to the place of combustion without diminishing their value as a fuel. The value and importance of this application of the steam-ejector are better appreciated when we realize the fact that these uncondensable gases contain about twenty per cent. of the heat-generating power of wood—that is, they represent twenty per cent of the full value of the wood.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The method of distilling and charring

wood, which consists in firing the charge and withdrawing the moist volatile products from the top of the charge, and condensing liquefiable portions, then closing the discharge-pipe
5 at the top of the kiln and withdrawing the gases down through the charge to the bottom of the kiln, condensing the liquefiable portions thereof, and forcing the uncondensed gases by a steam-jet ejector to a furnace for combustion.
10 2. The kiln A, pipes C C', located, respectively, at top and bottom of the kiln, condensers B B', flue D, and steam-pipe E, in combina-

tion with steam-nozzle G, for the purpose of moistening, giving body to, and projecting the non-condensable gases cooled in the carboni- 15 zation of wood to a place of combustion.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

HENRY M. PIERCE.

Witnesses:

DENNIS CHURCH,
WILLARD WARNER.